SECTION 22 1100

FACILITY WATER DISTRIBUTION

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LANL MASTER SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Mechanical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Specification developed for ML-3 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Building potable [and non-potable] water piping, valves, fittings, water heater, circulator pump, and accessories within the building envelope.

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01 3300, Submittal Procedures:

1. Catalog data on pipe materials, pipe fittings, valves, water heater, circulator pump, and accessories.

2. Installation instructions for valves and accessories.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01 2500, Substitution Procedures

2.2 PIPING, BURIED WITHIN THE BUILDING ENVELOPE

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AWWA C151 available pipe size: 4-64 inches.

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A. Ductile Iron Pipe: AWWA C151.

1. Fittings: AWWA C110, Ductile-Iron or Gray-Iron, Class 350 or AWWA C153, Ductile Iron Compact Fittings, Class 350.

B. Copper Tubing: ASTM B88, Type K, hard drawn or annealed.

1. Fittings: ANSI/ASME B16.22, wrought copper and copper alloy solder-joint.

2. Joints: AWS A5.8, BCuP silver braze.

2.3 PIPING ABOVE GRADE

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Specify Type K when design exceeds pressure and temperature ratings of Type L.
****

A. Copper Tubing: ASTM B88, Type L, hard drawn or annealed.

1. Fittings: ANSI/ASME B16.22, wrought copper and copper alloy solder-joint.

2. Joints: ASTM B32, Solder, Grade 95TA.

B. CPVC Pipe: ASTM D2846, for water service up to 180 degrees F.

1. Fittings: ASTM D2846, CPVC.

2. Joints: ASTM D2846, solvent weld with ASTM F493 solvent cement.

2.4 UNIONS AND FLANGES

A. Union for pipe 2 inches and under.

1. Copper Tubing: ASME B16.22, Class 150, wrought copper, solder joint.

B. Flanges for pipe over 2 inches.

1. Copper Tubing: ASME B16.5, Class 150, bronze.

2. Gaskets: 1/16 inch thick preformed neoprene.

2.5 VALVES, ABOVE GRADE

A. Ball Valves up to 2 inches:

1. Manufacturer: Nibco, Series 585-70.

2. MSS SP-110, 600 psi CWP, bronze, two piece body, chrome plated brass ball, full port, teflon seats and stuffing box ring, blowout proof stem, lever handle, solder or threaded ends.

B. Butterfly Valves over 2 inches:

1. Manufacturer: Nibco, Series LD 2000.

2. MSS SP-67, 200 psi CWP, ductile iron body, aluminum bronze disc, resilient replaceable EPDM seat, lug style, extended neck, lever handle, for use between ANSI Class 125/150 flanges.

C. Globe Valves up to 2 inches:

1. Manufacturer: Nibco, Series 211.

2. MSS SP-80, Class 125 bronze body, bronze trim, hand wheel, bronze disc, solder or threaded ends.

D. Gate Valves up to 2 inches:

1. Manufacturer: Nibco, Series 111.

2. MSS SP-80, Class 125 bronze body, bronze trim, rising stem, hand wheel, inside screw, solid wedge disc, solders or threaded ends.

2.6 SWING CHECK VALVES

A. Sizes up to 2 inches.

1. Manufacture: Nibco 433 Series.

2. MSS SP-80, Class 150 bronze, horizontal swing, Y pattern, renewable seat and disc. Solder or threaded ends to suit piping.

B. Sizes over 2 inches.

1. Manufacture: Nibco F-918.

2. MSS SP-80, Class 125 iron body, fluid to 450 degrees F, bolted bonnet, horizontal swing, renewable seat and disc, flanged.

2.7 SILENT CHECK VALVE

A. Size up to 2 inches.

1. Manufacturer: Nibco 480 Series.

2. Class 125 bronze, in line lift type, spring actuated, TFE seat and disc, solder or threaded ends to suit piping.

B. Sizes over 2 inches.

1. Manufacturer: Nibco F-910.

2. Class 125, iron body, fluid to 200 degrees F, renewable seats and disc, spring actuated, flanged.

2.8 PRESSURE REDUCING VALVES (PRV)

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Comply with Mechanical Standard Drawings ST-D2020-2 for PRV piping details
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A. Manufacturer: CLA-VAL, No. 90-0IAS.

B. Single seated, hydraulically operated, pilot controlled, diaphragm type valve, 175 psi pressure rating, 180 degree F maximum water temperature and 15 to 75 psi adjustment range. Pilot control; direct acting, adjustable, spring loaded, and normally open. Valve construction; globe, ductile iron main valve body and cover, bronze main valve trim, and cast bronze pilot control with stainless steel trim. Repairs must be done without removing valve from line.

1. Optional Features: Flow clean features and CV flow control (opening speed control).

C. Capacity/Size:

1. Flow: [ ] gpm.

2. Size: [ ] inches with female NPT union ends or ANSI class 150 flanged ends.

2.9 PRESSURE REDUCING VALVE (PRV)

A. Manufacturer: CLA-VAL, No. 90-OIAB.

B. Single seated, hydraulically operated, pilot controlled, diaphragm type valve, 175 psi pressure rating, 180 degree F maximum water temperature and 15 to 75 psi adjustment range. Pilot control; direct acting, adjustable, spring loaded, and normally open. Valve construction; glove, ductile iron main valve body and cover, bronze main valve trim, and cast bronze pilot control with stainless steel trim. Repairs must be done without removing valve from line.

1. Optional Features: Flow clean strainer and shutoff cocks to isolate pilot system.

C. Capacity/Size:

1. Flow: [ ] gpm.

2. Size: [ ] inches with ANSI class 150 flanged ends.

2.10 PRESSURE REDUCING VALVES (PRV)

A. Manufacturers:

1. CLA-VAL, No. 990.

2. Watts Regulator Company, No. 25AUB or No. U5B.

B. Balanced single seat with bronze valve body and cover, stainless steel trim, integral strainer, 160 degrees F, maximum water temperature, and approx adjustments range [25-90] psi. Repairs must be done without removing valve from line.

C. Capacity/Size:

1. Flow: [ ] gpm.

2. Size: [ ] inches with NP t with union inlet connection.

2.11 CIRCULATOR PUMP, HOT WATER

A. Manufacturer: Bell and Gossett, Series [100].

B. Bronze body, brass impeller, steel shaft, suitable for 125 psi working pressure and 225 degrees F water temperature, mechanical seal, direct drive, and oil lubricated drip proof motor, 1750 rpm.

C. Performance:

1. Flow: [ ] gpm at [ ] feet head.

2. Electrical: [ ] hp, [ ] volts, [ ] phase, 60 Hz.

2.12 COMMERCIAL GAS WATER HEATER

A. Manufacturer: Lochinvar, Charger Model [CNR].

B. Performance:

1. Storage capacity: [ ].gallons.

2. Input: [ ] Btuh at sea level.

3. Minimum Recovery Rate: [ ] gph at 100 degrees F rise.

****
Specify ASME labeling for heaters larger than 199,000 Btuh.
****

C. Natural gas fired, automatic, vertical storage water heater, glass lined welded steel, [ASME labeled], multiple flue passages, inspection port, magnesium anodes, thermally insulated, encased in corrosion-resistant steel jacket, enamel finish. Entire heater approved by AGA for operation at 180 degrees F, 7500 feet altitude installation. Furnish with ASME rated temperature and pressure relief valve.

*******[OR]*******

****

Use the following for units with less than 400,000 Btuh input.

****

D. Controls: AGA certified, automatic water thermostat with adjustable temperature range from 120 to 180 degrees F. Automatic reset high temperature limiting thermostat factory set at 195 degrees F, gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, flue baffle and draft hood, and self-generating controls with no external power source.

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Use the following for units with 400,000 Btuh input or more.

****

E. Controls: AGA certified, automatic direct immersion thermostat with temperature range adjustable minimum 175 degrees F differential. Automatic reset high temperature limiting thermostat factory set at 195 degrees F. Gas pressure regulator, multi-ribbon or tubular burner. One-hundred percent safety shut-off pilot and thermocouple, intermittent electronic ignition monitoring pilot and main flame, trial for re-ignition for momentary loss of flame, shut down of pilot and main burner in 2 to 4 seconds after loss of flame, [automatic flue damper] [and power vent]. Control circuit 120 VAC with 24 VAC transformer.

2.13 STRAINERS

A. Sizes up to 2 inches:

1. Manufacturer: Keckley, Style F-150.

2. Threaded bronze body, 200 psi – 150 degrees F WOG, Y pattern with standard 20 mesh stainless steel screen.

B. Size over 2 inches:

1. Manufacturer: Keckley, Style A.

2. Class 125 flanged iron body, 200 psi – 150 degrees F WOG, Y pattern with standard 1/16 inch stainless steel perforated screen.

2.14 HOSE BIB (WALL HYDRANT)

A. Manufacturer: J.R. Smith Mfg. Co.

B. ANSI A112.21.3, non-freeze, integral vacuum breaker, bronze or brass [nickel plated], 3/4 inch exposed hose connection, 1/4 turn, T-handle key.

C. ANSI A112.21.3, non-freeze, integral vacuum breaker, bronze or brass, concealed 3/4 inch hose connection, 1/4 turn, T-handle key, stainless steel box with hinged locking cover.

2.15 BACKFLOW PREVENTER, THREADED ENDS

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Comply with Mechanical Standard Drawings ST-D10-30GEN-1 for backflow preventer details. The LANL Utilities Group water system representative shall approve design and installation of backflow preventers installed outside the building (see Spec 33 1000).

NOTE: BFP series listed below are for cold water service.

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A. Provide models listed in the latest edition of Approved Backflow Prevention Assemblies by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research.

1. Suggested Manufactures:

a. Conbraco, Series 40-200.

b. Wilkins, Series 975XL.

c. Watts, Series 909.

B. Assembly, reduce pressure type, bronze body, with ball type shutoff valves, FNPT ends, test cocks for in line field testing, integral unions between body and shut-off valves, and air gap drain funnel. Maximum water temperature range 33 to 140 degrees F, maximum rated working pressure 150 psi.

1. Size: [ ] inch.

2.16 BACKFLOW PREVENTER, FLANGED ENDS

A. Provide models listed in the latest edition of Approved Backflow Prevention Assemblies by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research.

1. Suggested Manufactures:

a. Conbraco, Series 40200.

b. Wilkins, Series 975.

c. Watts, Series 909.

B. Assembly, reduced pressure type, cast iron body epoxy coated internal and external, with OS & Y shut-off valves, flanged ends, test cocks for in-line field testing, and an air gap drain funnel. Maximum water temperature range 33 to 140 degrees F, maximum rated working pressure 175 psi.

1. Size: [ ] inch.

2.17 PRESSURE GAUGE

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Refer to manufacturer's recommendation for gauge pressure ranges. Generally, a pressure range of twice the working pressure is recommended, with maximum working pressure not exceeding 75 percent of the range. If pulsation occurs, working pressure should not exceed 65 percent of the pressure range.
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A. Manufacturer: Ashcroft, Type 1009

B. ASME B40.100, Grade 1A, maximum plus or minus 1 percent full scale accuracy, minimum 2 1/2 inch dial, stainless steel case, phosphor bronze bourden tube and 1/4 inch NPT brass bottom connection. Furnish with brass ball valve.

1. Range: [ ] psi or [See drawings].

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

3.2 INSTALLATION

A. Comply with Uniform Plumbing Code (IAMPO).

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls

D. Install piping to maintain headroom and neither interfere with use of space nor take more space than necessary.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide access where valves and other equipment are not exposed.

H. Install valves with stems upright or horizontal, not inverted.

I. Pipe relief from safety valves and backflow preventers to nearest floor drain.

J. Slope water piping and provide drain valves at low points.

K. Disinfect water distribution system in accordance with Section 22 0816.

L. Pressure test piping system in accordance with Section 22 0813.

M. Label piping system in accordance with Section 22 0554.

N. Insulate piping system in accordance with Section 22 0713.

O. Support piping system in accordance with Section 22 0529.

P. Sleeve and caulk pipes penetrating exterior walls or interior bearing walls. Provide waterproof installation for exterior walls. Provide UL/FM approved through-penetration firestop system when penetrating fire- rated barriers (i.e., walls, floors, etc.).

Q. Paint exposed piping in occupied spaces to match background color.

R. Install chrome-plated steel escutcheons where pipes are not insulated in finished areas.

S. Provide stops on waterlines for plumbing fixtures.

T. Above Grade Piping: Provide ball valves or gate valves in piping 2 inches and smaller and butterfly valves in piping 2 1/2 inches and larger. Provide globe valves for throttling application.

END OF SECTION

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Do not delete the following reference information:

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FOR LANL USE ONLY

This project specification is based on LANL Master Specification 22 1100 Rev. 0, dated January 6, 2006.